

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A semiconductor memory device comprising:

a nonvolatile memory section; and

a volatile memory section, wherein

the nonvolatile memory section includes a nonvolatile memory cell having a single gate electrode formed on a semiconductor layer via a gate insulating film, a channel region disposed under the gate electrode, diffusion regions disposed on both sides of the channel region and having a conductive type opposite to that of the channel region, and memory functional units formed on both sides of the gate electrode and having a function for retaining charges.

2. (Original) The semiconductor memory device according to claim 1, wherein

the volatile memory section includes an SRAM.

3. (Currently Amended) The semiconductor memory device according to claim 21, wherein

the nonvolatile memory cell and the ~~SRAM~~ volatile memory cell are formed on a single chip.

4. (Original) The semiconductor memory device according to claim 1, wherein

the volatile memory section includes a DRAM.

5. (Original) The semiconductor memory device according to claim 4, wherein the volatile memory section includes refreshing operation means for refreshing the DRAM.

6. (Original) The semiconductor memory device according to claim 1, further comprising:

- a first chip forming the nonvolatile memory section;
- a second chip forming the volatile memory section; and
- a single package containing therein the first chip and the second chip.

7. (Original) The semiconductor memory device according to claim 1, wherein at least a part of the memory functional units overlaps with a part of the diffusion region.

8. (Withdrawn) The semiconductor memory device according to claim 1, wherein the memory functional units include a retaining film having a function for retaining charges, and a surface of the retaining film is arranged almost in parallel to a surface of the gate insulating film.

9. (Withdrawn) The semiconductor memory device according to claim 8, wherein

the film having the function of retaining charges is arranged almost in parallel to a side surface of the gate electrode.

10. (Withdrawn) The semiconductor memory device according to claim 1, wherein the memory functional units include a retaining film having a function for retaining charges and an insulating film for separating the retaining film from one of the channel region and the semiconductor layer, the insulating film having a thickness smaller than that of the gate insulating film and not smaller than 0.8 nm.

11. (Withdrawn) The semiconductor memory device according to claim 1, wherein the memory functional unit includes a retaining film having a function for retaining charges and an insulating film for separating the retaining film from one of the channel region and the semiconductor layer, the insulating film having a thickness greater than that of the gate insulating film and not greater than 20 nm.

12. (Currently Amended) A semiconductor device comprising:
a semiconductor memory device that comprises:
a nonvolatile memory section;
a volatile memory section, wherein
the nonvolatile memory section includes a nonvolatile memory cell having a single gate electrode formed on a semiconductor layer via a gate insulating film, a channel region disposed

under the gate electrode, a diffusion regions disposed on both sides of the channel region and having a conductive type opposite to that of the channel region, and memory functional units formed on both sides of the gate electrode and having a function for retaining charges; and

a logical operation section for performing operation processing on the basis of information stored in the semiconductor memory device.

13. (Currently Amended) A portable electronic apparatus comprising a semiconductor memory device comprising:

a nonvolatile memory section; and

a volatile memory section, wherein

the nonvolatile memory section includes a nonvolatile memory cell having a single gate electrode formed on a semiconductor layer via a gate insulating film, a channel region disposed under the gate electrode, diffusion regions disposed on both sides of the channel region and having a conductive type opposite to that of the channel region, and memory functional units formed on both sides of the gate electrode and having a function for retaining charges.

14. (Currently Amended) A portable electronic apparatus comprising a semiconductor memory device comprising:

a nonvolatile memory section;

a volatile memory section, wherein

the nonvolatile memory section includes a nonvolatile memory cell having a single gate electrode formed on a semiconductor layer via a gate insulating film, a channel region disposed under the gate electrode, ~~a~~-diffusion regions disposed on both sides of the channel region and having a conductive type opposite to that of the channel region, and memory functional units formed on both sides of the gate electrode and having a function for retaining charges; and

a logical operation section for performing operation processing on the basis of information stored in the semiconductor memory device.

15. (Previously Presented) The portable electronic apparatus according to claim 13, wherein

the volatile memory section includes an SRAM.

16. (Currently Amended) The portable electronic apparatus according to claim ~~15~~13, wherein

the nonvolatile memory cell and the ~~SRAM~~-volatile memory cell are formed on a single chip.

17. (Previously Presented) The portable electronic apparatus according to claim 13, wherein

the volatile memory section includes a DRAM.

18. (Previously Presented) The portable electronic apparatus according to claim 17, wherein

the volatile memory section includes refreshing operation means for refreshing the DRAM.

19. (Previously Presented) The portable electronic apparatus according to claim 13, further comprising:

a first chip forming the nonvolatile memory section;

a second chip forming the volatile memory section; and

a single package containing therein the first chip and the second chip.

20. (Previously Presented) The portable electronic apparatus according to claim 13, wherein

at least a part of the memory functional units overlaps with a part of the diffusion region.

21. (Withdrawn) The portable electronic apparatus according to claim 13, wherein the memory functional units include a retaining film having a function for retaining charges, and a surface of the retaining film is arranged almost in parallel to a surface of the gate insulating film.

22. (Withdrawn) The portable electronic apparatus according to claim 21, wherein

the film having the function of retaining charges is arranged almost in parallel to a side surface of the gate electrode.

23. (Withdrawn) The portable electronic apparatus according to claim 13, wherein the memory functional units include a retaining film having a function for retaining charges and an insulating film for separating the retaining film from one of the channel region and the semiconductor layer, the insulating film having a thickness smaller than that of the gate insulating film and not smaller than 0.8 nm.

24. (Withdrawn) The portable electronic apparatus according to claim 13, wherein the memory functional unit includes a retaining film having a function for retaining charges and an insulating film for separating the retaining film from one of the channel region and the semiconductor layer, the insulating film having a thickness greater than that of the gate insulating film and not greater than 20 nm.

25. (New) The semiconductor memory device according to claim 3, wherein said volatile memory section has substantially the same structure as the nonvolatile memory section, except that said volatile memory section has additional extension regions adjacent to the diffusion regions on both sides of the channel region.

26. (New) The portable electronic apparatus according to claim 16,

wherein said volatile memory section has substantially the same structure as the nonvolatile memory section, except that said volatile memory section has additional extension regions adjacent to the diffusion regions on both sides of the channel region.

27. (New) The semiconductor memory device according to claim 25, wherein said extension regions of said volatile memory section are lightly doped drain regions.

28. (New) The semiconductor memory device according to claim 26, wherein said extension regions of said volatile memory section are lightly doped drain regions.

29. (New) The semiconductor memory device according to claim 1,
wherein each memory functional unit is
a film having a function of accumulating or trapping charges or a function of holding a charge polarized state, which is an insulator film including a silicon nitride film;
an insulator film having therein a conductor film or a semiconductor layer;
an insulator film having therein one or more dots made of a conductor or a semiconductor; or
a single layer or a lamination layer of an insulator film including a ferroelectric film in which internal charges are polarized by an electric field and its state is held.

30. (New) The portable electronic apparatus according to claim 13,

wherein each memory functional unit is

- a film having a function of accumulating or trapping charges or a function of holding a charge polarized state, which is an insulator film including a silicon nitride film;
- an insulator film having therein a conductor film or a semiconductor layer;
- an insulator film having therein one or more dots made of a conductor or a semiconductor; or
- a single layer or a lamination layer of an insulator film including a ferroelectric film in which internal charges are polarized by an electric field and its state is held.